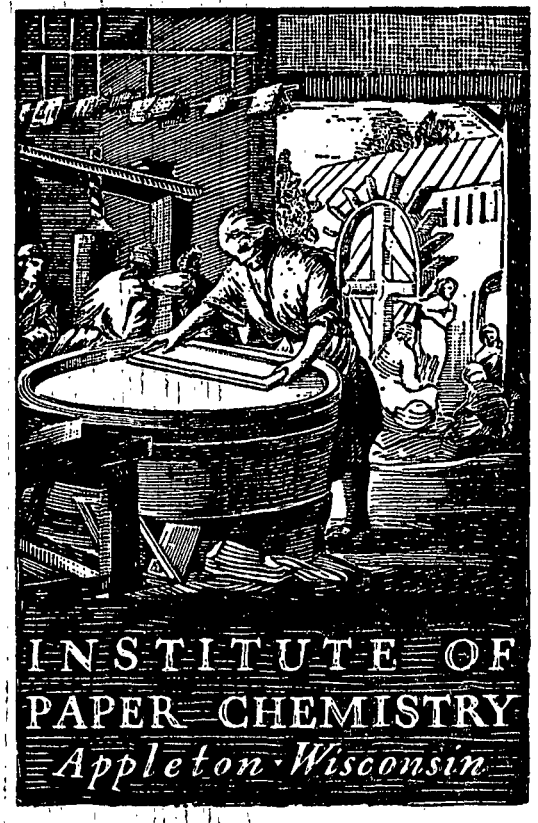

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Report 109

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

October 1, 1964

PROJECT 1108-17 - REPORT 109

Company - Mill	Machine	Code Letter
The Chesapeake Corporation - West Point	#1	--
Container Corporation of America-Circleville	#5	E
Continental Can Company, Inc. - Hopewell	#1	L
- Hodge	#1	Y
Crown Zellerbach Corporation - Baltimore	#1	I
- Baltimore	#2	S
- Bogalusa	#4	V
- Lebanon	#1	--
- Lebanon	#2	W
International Paper Company - Bastrop	#1	P
- Bastrop	#2	G
- Georgetown	#1	J
The Mead Corporation - Harriman	#1	M
- Knoxville	#1	--
- Lynchburg	#2	Q
- Sylva	#1	--
Olin Mathieson Chemical Corporation - Monroe	#1	--
- Monroe	#2	--
Owens-Illinois Glass Company - Big Island	#3	F
- Tomahawk	#1	N
- Tomahawk	#2	R
- Tomahawk	#3	D
Packaging Corporation of America-Filer City	#1	A
-Filer City	#2	K
St. Joe Paper Company - Port St. Joe	#1	X
St. Regis Container Corporation-Coshocton	#1	H
Union Bag-Camp Paper Corporation-Savannah	#2	C
- Monroe	#2	U
West Virginia Pulp and Paper Company		
- Covington	#6	T
- Covington	#7	--
- Charleston	--	--
- Williamsburg	#1	O
- Williamsburg	#2	--
Weyerhaeuser Company		
North Carolina Division - Plymouth	#3	B

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Report 109

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

October 1, 1964

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

INTRODUCTION

As requested by the Technical Committee of the Fourdrinier Kraft Board Institute, Inc., the reports pertinent to the continuous evaluation of corrugating medium have been prepared by The Institute of Paper Chemistry on a bimonthly instead of monthly basis since August 1, 1961. The current report presents results obtained during the months of August and September, 1964, on 169 rolls of corrugating medium representing the production of twenty-five machines. Each of these 169 rolls of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), H. and D. flat crush on single-faced board, and runnability. The evaluation of runnability was initiated by corrugating each roll under standardized conditions on the Institute's corrugator into A-flute board at 600 feet per minute with minimum tension and recording the draw factor at this condition if the roll ran satisfactorily. If unsatisfactory runnability occurred at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runnability was obtained, i.e., no ruptured flutes. In this latter case the draw factor was recorded for the highest speed below 600 f.p.m. at which the roll ran satisfactorily. If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch. Flat crush was determined on the single-faced board obtained at a speed of 600 f.p.m. with minimum tension. The flat crush results, in addition to supplying information about quality, will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

For each participating machine, the current machine averages associated with the current period are shown for each test in Table I and presented graphically in Fig. 1 to 4. A tabulation of the number of rolls and type of medium evaluated is also given in Table I for each machine. The current machine average is the mean of the test averages obtained on all rolls of corrugating medium evaluated from a given machine during the current period. In addition to the test data obtained for the various machines, Table I also presents the current F.K.I. averages, cumulative F.K.I. averages, and the F.K.I. indexes. The current F.K.I. average for each test is the mean of the current machine averages for all machines participating in the study during a given period (excluding the current machine averages based on the evaluation of fewer than three rolls of corrugating medium as requested by the Technical Committee). The cumulative F.K.I. average for each test is the mean of the current F.K.I. averages for the previous twelve-month period excluding the average for the current period. The F.K.I. index for each test is obtained as follows:

$$\frac{\text{current F.K.I. average}}{\text{cumulative F.K.I. average}} \times 100 = \text{F.K.I. index (\%)}$$

The F.K.I. index provides a ready means of comparing the current quality with previous results. An index greater than 100% indicates that current quality is higher than the average result for the previous twelve periods; an index below 100% indicates that current quality is lower than the average result for the previous twelve periods.

The test results obtained on the rolls submitted from the production of individual machines during the current period are shown in Tables II through XXVI for Machines A through Y, respectively. The maximum, minimum, and average test results obtained on each roll are shown for all tests except basis weight for which only the average is shown; in addition, the over-all average result for all rolls

TABLE I

SUMMARY OF CURRENT MACHINE AVERAGES
August and September, 1964

Mill Code	No. of Samples	Type of Medium	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	7	Semichemical	26.3	9.8	33.9	30.9
B	7	Semichemical	26.3	10.2	38.5	35.0
C	9	Semichemical	26.7	9.2	37.1	35.1
D	8	Semichemical	27.1	10.5	36.5	33.5
E	7	Semichemical	27.5	11.4	36.3	34.0
F	9	Semichemical	26.8	10.2	35.2	33.1
G	5	Semichemical	27.1	10.3	41.3	38.3
H	6	Bogus	27.5	10.6	36.1	34.7
I	8	Bogus	27.4	9.9	32.8	31.2
J	7	Semichemical	27.1	9.9	40.7	37.5
K	7	Semichemical	26.0	9.9	33.1	30.3
L	12	Semichemical	28.3	11.1	39.7	37.6
M	6	Semichemical	27.4	10.6	34.6	32.0
N	8	Semichemical	26.6	10.1	38.2	34.7
O	8	Semichemical	26.1	10.0	34.5	32.5
P	5	Semichemical	26.6	10.3	40.0	37.4
Q	8	Semichemical	26.8	9.8	35.3	32.0
R	8	Semichemical	26.4	10.1	36.1	33.8
S	8	Bogus	27.4	9.6	36.4	35.2
T	7	Semichemical	27.0	10.6	36.0	32.5
U	8	Bogus	27.8	10.4	34.2	31.6
V	2	Semichemical	See note [a]			
W	4	Semichemical	26.6	9.6	37.3	35.5
X	4	Kraft	28.9	9.3	34.7	33.2
Y	1	Semichemical	See note [a]			
Total	23					
Current F.K.I. average			27.0	10.1	36.5	34.0
Cumulative F.K.I. average			27.0	10.2	36.1	32.5
F.K.I. index, %			100.0	99.0	101.0	104.5

[a] Current machine averages have been omitted in compliance with the Technical Committee's request that current machine averages based on evaluations of fewer than three rolls of medium should be excluded from the summary table and from the calculation of the current F.K.I. averages.

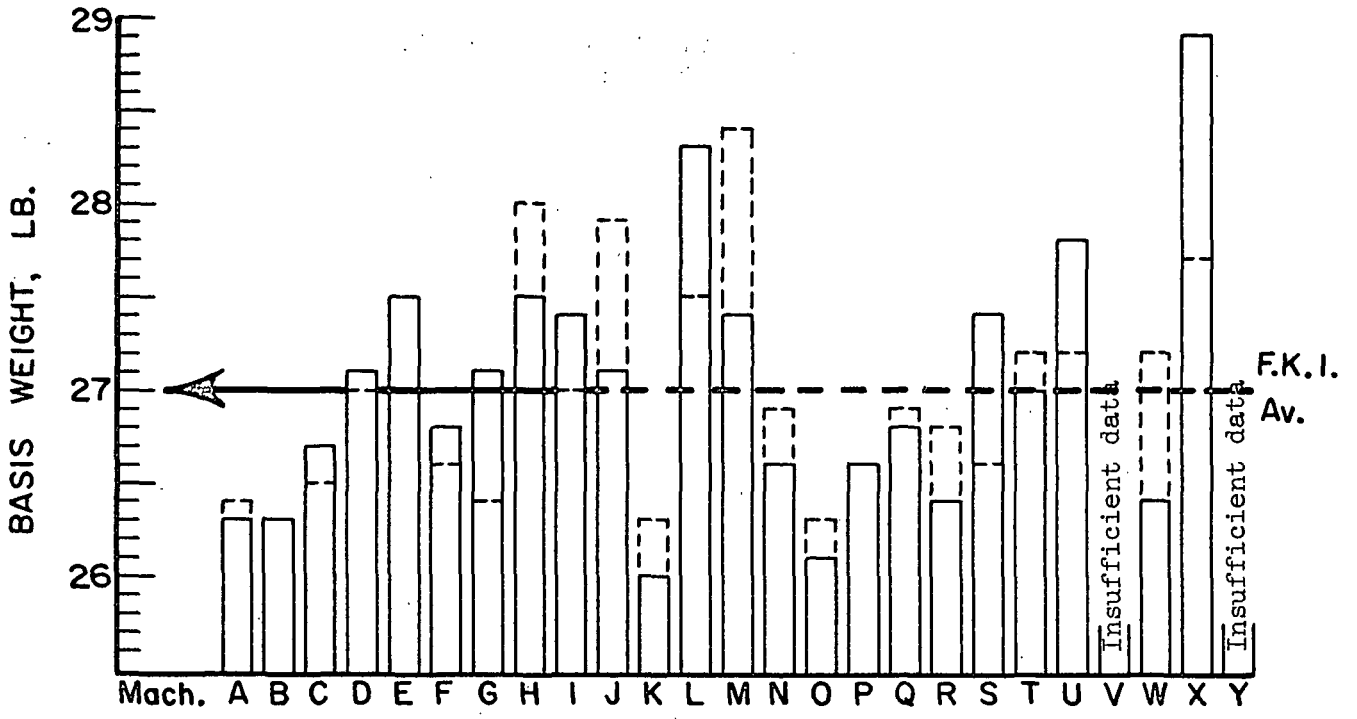

Figure 1. Comparison of Basis Weight Results

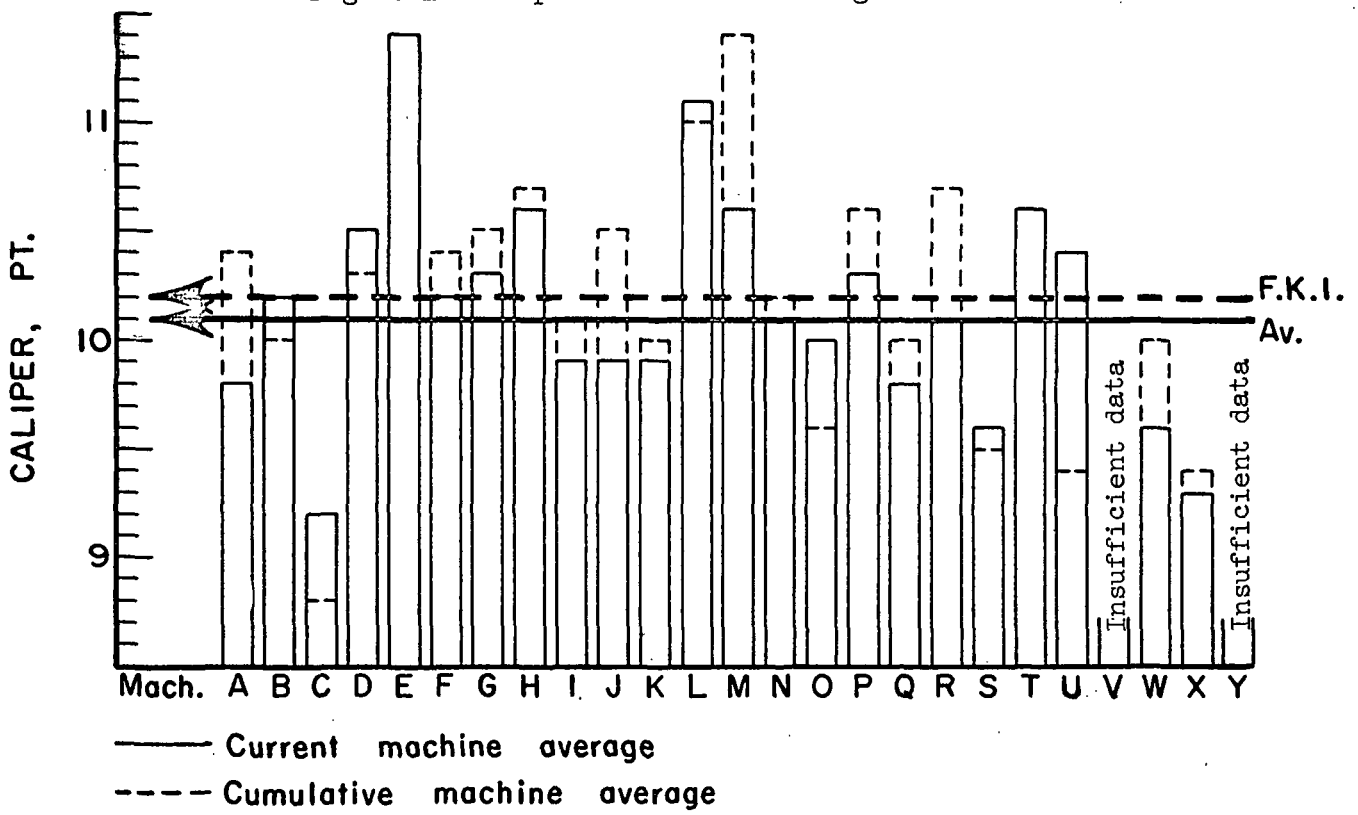

Figure 2. Comparison of Caliper Results

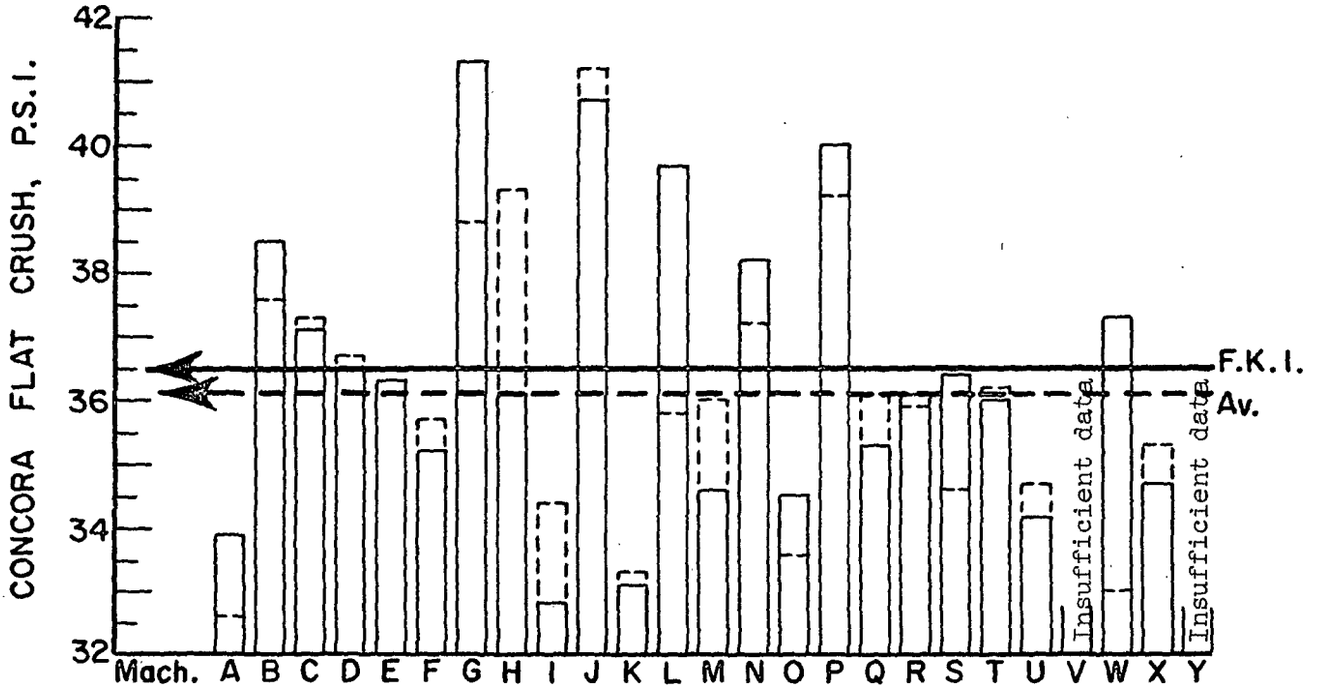

Figure 3. Comparison of Concora Flat Crush Results

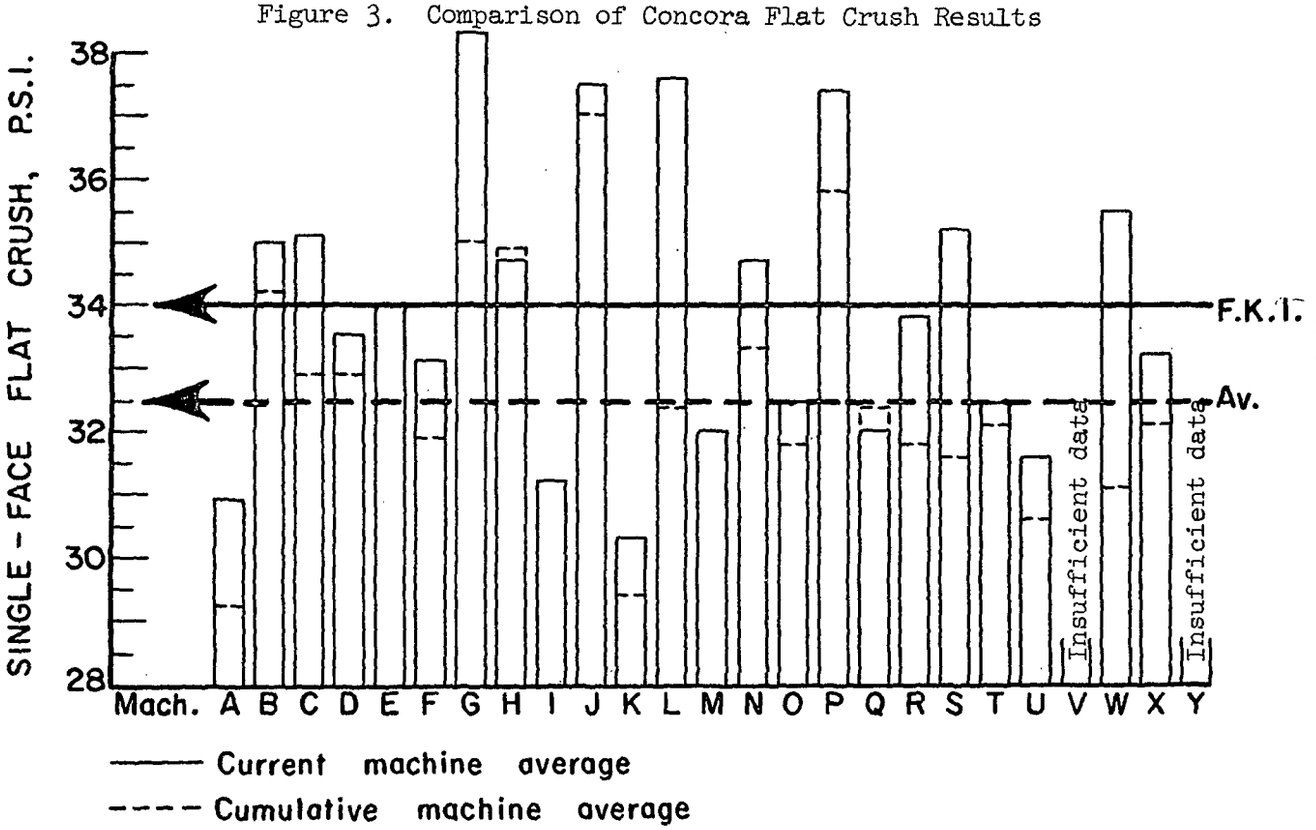

Figure 4. Comparison of Single-Face Flat Crush Results

TABLE II

SUMMARY OF TEST RESULTS FOR MACHINE A
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability, lb./in.[a]	Draw Factor[b]
A-1	7-29-64	8- 4-64	124	26.1	10.0	9.2	9.8	35.4	32.4	34.4	33.2	31.2	32.2	1-1/2	1.573
A-2	8- 1-64	8- 6-64	125	26.1	9.9	9.3	9.8	34.8	33.0	34.1	31.0	29.2	30.4	1-1/2	1.574
A-3	8-13-64	8-18-64	126	27.1	10.1	9.7	10.0	33.6	30.0	32.0	32.0	29.8	30.8	1-1/2	1.573
A-4	8-18-64	8-25-64	127	27.0	10.9	10.0	10.5	36.6	32.4	34.2	30.0	27.4	29.2	1-1/2	1.573
A-5	8-27-64	9- 2-64	128	25.8	9.9	9.3	9.7	35.4	32.4	33.2	30.6	28.8	30.0	1-1/2	1.574
A-6	9-10-64	9-16-64	129	26.1	10.0	8.7	9.6	37.2	31.8	34.3	32.2	29.6	30.9	1-1/2	1.577
A-7	9-16-64	9-22-64	130	26.1	9.7	9.3	9.5	36.0	32.4	34.8	33.8	30.8	32.5	1-1/2	1.573
Current machine average				26.3			9.8			33.9			30.9		1.574
Cumulative machine average				26.4			10.4			32.6			29.2		
Machine factor, %				99.9			94.7			103.8			105.6		
Machine index, %				97.6			96.0			93.9			95.0		

TABLE III

SUMMARY OF TEST RESULTS FOR MACHINE B
August and September, 1964
(Type of medium: semichemical)

B-1	7-15-64	8-14-64	464	26.2	11.0	9.8	10.5	40.8	37.8	39.7	38.2	34.6	36.4	Note [c]	1.540
B-2	7-24-64	8-14-64	733	27.0	10.7	9.9	10.4	42.0	37.2	39.6	39.0	35.4	37.1	Min.	1.554
B-3	8- 4-64	8-14-64	89	27.1	10.8	9.8	10.3	43.8	37.8	39.6	36.8	35.2	36.3	Min.	1.551
B-4	8- 4-64	8-14-64	96	24.3	9.4	8.8	9.1	40.2	32.4	36.8	33.6	30.6	32.1	Min.	1.553
B-5	8-17-64	9-16-64	460	27.0	11.4	10.2	10.7	37.2	32.4	35.0	33.6	30.8	31.8	Note [d]	1.548
B-6	8-25-64	9-16-64	718	25.7	10.9	9.8	10.3	39.0	34.8	36.6	35.6	31.6	33.6	Note [e]	1.546
B-7	8-31-64	9-16-64	916	26.5	10.5	9.7	10.1	43.2	40.2	41.9	38.8	34.6	37.3	Note [f]	1.546
Current machine average				26.3			10.2			38.5			35.0		1.548
Cumulative machine average				26.3			10.0			37.6			34.2		
Machine factor, %				100.0			101.9			102.4			102.1		
Machine index, %				97.3			100.0			106.6			107.5		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.
[c] Maximum speed at which this roll could be corrugated with minimum tension was 175 f.p.m.
[d] Maximum speed at which this roll could be corrugated with minimum tension was 300 f.p.m.
[e] Maximum speed at which this roll could be corrugated with minimum tension was 375 f.p.m.
[f] Maximum speed at which this roll could be corrugated with minimum tension was 500 f.p.m.

TABLE IV

SUMMARY OF TEST RESULTS FOR MACHINE C
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability,	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	lb./in.[a]	Draw Factor[b]
C-1	7-15-64	7-29-64	599	27.4	9.2	8.9	9.0	41.4	33.0	37.0	37.2	35.0	36.1	1-1/2	1.569
C-2	7-25-64	8- 4-64	601	26.2	9.6	9.0	9.1	37.2	33.6	35.2	35.4	31.8	34.3	1	1.563
C-3	7-30-64	8-10-64	602	26.9	9.3	8.9	9.1	38.4	34.2	36.1	35.8	32.4	34.4	1-1/2	1.566
C-4	8- 1-64	8-13-64	603	26.8	9 3	8.9	9.1	39.6	33.6	37.2	35.4	34.6	35.1	1	1.565
C-5	8- 8-64	8-17-64	604	26.5	8.9	8.6	8.8	40.2	39.0	39.6	36.0	33.4	34.8	1	1.568
C-6	8-26-64	9- 8-64	605	26.7	10.4	9.2	10.0	37.8	33.6	36.1	36.2	33.6	35.0	1/2	1.565
C-7	9- 1-64	9- 8-64	606	26.9	9.3	9.0	9.2	39.0	36.0	37.3	36.2	34.8	35.5	1-1/2	1.567
C-8	9- 4-64	9-16-64	607	26.9	9.9	9.2	9.6	42.0	37.8	38.9	38.2	36.2	37.4	1/2	1.555
C-9	9-16-64	9-24-64	608	26.0	8.9	8.5	8.8	39.6	32.4	36.5	34.2	32.2	33.0	1-1/2	1.573
Current machine average				26.7			9.2			37.1			35.1		1.566
Cumulative machine average				26.5			8.8			37.3			32.9		
Machine factor, %				100.9			104.0			99.5			106.4		
Machine index, %				98.9			89.5			102.8			107.9		

TABLE V

SUMMARY OF TEST RESULTS FOR MACHINE D
August and September, 1964
(Type of medium: semichemical)

D-1	8-10-64	8-19-64	--	26.8	10.7	10.0	10.3	37.2	35.4	36.2	34.4	32.4	33.6	Min.	1.556
D-2	8-11-64	8-19-64	--	27.5	10.9	10.6	10.8	37.8	34.2	36.4	35.6	33.4	34.4	1/2	1.556
D-3	8-13-64	8-19-64	--	26.8	10.8	10.1	10.4	37.8	33.0	34.8	33.4	29.2	30.9	1/2	1.564
D-4	8-14-64	8-19-64	--	27.4	10.7	10.0	10.5	37.8	36.0	37.3	35.4	32.6	34.0	1/2	1.557
D-5	9- 3-64	9-24-64	--	27.4	10.9	10.3	10.6	41.4	33.0	38.3	37.2	33.6	34.9	1	1.561
D-6	9- 4-64	9-24-64	--	26.7	10.5	10.0	10.2	37.8	33.0	35.8	34.8	32.0	33.2	1-1/2	1.561
D-7	9-10-64	9-24-64	--	26.9	11.0	10.4	10.8	37.8	34.2	36.2	35.2	32.0	33.6	1/2	1.561
D-8	9-11-64	9-24-64	--	26.9	11.0	10.5	10.8	39.0	34.8	37.2	33.8	32.4	33.2	1/2	1.561
Current machine average				27.1			10.5			36.5			33.5		1.560
Cumulative machine average				27.0			10.3			36.7			32.9		
Machine factor, %				100.2			102.1			99.5			101.7		
Machine index, %				100.2			102.8			101.2			103.0		

[a]Maximum tension at 600 f.p.m.
[b]600 f.p.m., minimum tension.

TABLE VI

SUMMARY OF TEST RESULTS FOR MACHINE E
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability,	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	lb./in.[a]	Draw Factor[b]
E-1	6-30-64	8-12-64	49	26.7	11.9	10.7	11.3	38.4	31.2	34.7	34.8	32.0	33.8	1	1.561
E-2	7-20-64	8-12-64	50	27.9	12.0	11.0	11.6	40.2	34.8	37.7	38.2	34.0	36.6	1	1.562
E-3	7-21-64	8-12-64	51	28.2	11.7	11.0	11.3	40.2	37.2	38.4	38.6	36.4	37.3	1	1.561
E-4	8-14-64	9-15-64	52	27.8	12.3	11.5	11.9	37.2	34.2	35.9	34.6	33.4	34.1	1	1.563
E-5	8-14-64	9-15-64	53	27.1	11.8	11.0	11.4	36.6	33.6	34.9	33.0	30.6	32.0	1	1.566
E-6	8-20-64	9-15-64	54	27.1	12.0	10.8	11.0	37.8	34.2	37.0	34.2	31.4	32.9	1	1.568
E-7	8-22-64	9-15-64	55	27.6	11.5	10.6	11.0	39.0	33.6	35.6	32.8	30.6	31.5	1	1.565
Current machine average				27.5			11.4			36.3			34.0		1.564
Cumulative machine average				--			--			--			--		
Machine factor, %				--			--			--			--		
Machine index, %				101.8			110.9			100.6			104.7		

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE F
August and September, 1964
(Type of medium: semichemical)

F-1	6-26-64	8- 3-64	5082	26.3	11.0	10.3	10.7	35.4	33.0	34.4	35.0	33.4	34.1	1	1.564
F-2	6-27-64	8- 3-64	5306	26.9	10.2	9.8	10.0	37.8	33.0	35.3	34.4	31.6	33.2	1/2	1.563
F-3	6-29-64	8- 3-64	5789	26.8	10.2	9.8	10.0	37.8	31.8	34.9	34.2	32.6	33.5	1	1.563
F-4	6-30-64	8- 3-64	5909	26.7	10.2	9.8	10.0	36.6	32.4	34.2	32.8	30.0	31.8	1	1.564
F-5	7- 1-64	8- 3-64	90	27.3	10.8	10.0	10.3	39.6	33.0	36.4	34.4	32.4	33.2	1	1.564
F-6	7- 2-64	8- 3-64	270	26.9	10.3	9.9	10.0	36.6	32.4	34.7	34.8	32.0	33.3	1	1.562
F-7	7- 8-64	8- 3-64	1939	27.0	10.1	10.0	10.0	38.4	31.8	35.0	32.8	31.0	31.8	1	1.564
F-8	8- 1-64	9-21-64	93	27.1	10.1	9.7	10.0	39.6	38.4	38.9	37.2	34.6	35.5	1-1/2	1.568
F-9	8- 4-64	9-21-64	621	25.7	10.9	10.1	10.7	34.2	31.2	32.9	32.4	31.0	31.8	1	1.564
Current machine average				26.8			10.2			35.2			33.1		1.564
Cumulative machine average				26.6			10.4			35.7			31.9		
Machine factor, %				100.5			97.8			98.7			103.9		
Machine index, %				99.1			100.0			97.5			101.9		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE G
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability,	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	lb./in.[a]	Draw Factor[b]
G-1	7-30-64	8-12-64	392	27.5	10.9	10.0	10.4	46.8	40.8	43.4	39.2	37.6	38.4	1	1.554
G-2	8- 4-64	8-13-64	393	27.1	10.8	9.1	10.0	42.6	41.4	42.1	41.0	38.8	40.1	1-1/2	1.561
G-3	8-11-64	8-21-64	394	27.1	10.9	10.0	10.4	40.8	39.0	39.6	37.8	34.8	36.2	Min.	1.562
G-4	8-12-64	8-24-64	395	27.0	10.3	9.7	10.1	42.6	37.8	40.6	39.0	36.0	37.5	1/2	1.565
G-5	8-27-64	9- 8-64	396	27.0	10.8	10.0	10.5	43.2	37.8	40.8	40.6	38.2	39.2	1-1/2	1.557
Current machine average				27.1			10.3			41.3			38.3		1.560
Cumulative machine average				26.4			10.5			38.8			35.0		
Machine factor, %				102.8			98.2			106.3			109.3		
Machine index, %				100.5			100.2			114.5			117.8		

TABLE IX

SUMMARY OF TEST RESULTS FOR MACHINE H
August and September, 1964
(Type of medium: bogus)

H-1	8- 4-64	8-20-64	454	28.1	11.1	10.0	10.6	38.4	34.8	36.4	34.0	32.8	33.4	Min.	1.556
H-2	8- 5-64	8-20-64	455	27.9	11.0	10.3	10.7	40.8	32.4	36.5	36.4	32.6	34.9	Min.	1.554
H-3	9- 2-64	9-16-64	456	27.5	11.1	10.0	10.6	37.2	30.0	34.1	35.8	34.0	34.8	1-1/2	1.561
H-4	9- 7-64	9-16-64	457	27.5	11.0	10.0	10.6	38.4	31.2	35.0	36.4	33.8	35.2	1	1.556
H-5	9-10-64	9-21-64	458	26.8	11.0	10.1	10.5	39.0	34.8	37.2	36.2	34.2	35.0	Min.	1.556
H-6	9-14-64	9-21-64	459	27.2	11.0	9.9	10.6	40.8	31.8	37.3	37.0	32.2	34.8	Min.	1.553
Current machine average				27.5			10.6			36.1			34.7		1.556
Cumulative machine average				28.0			10.7			39.3			34.9		
Machine factor, %				98.1			98.9			91.9			99.4		
Machine index, %				101.9			103.5			100.0			106.7		

[a]Maximum tension at 600 f.p.m.
[b]600 f.p.m., minimum tension.

TABLE X

SUMMARY OF TEST RESULTS FOR MACHINE I
August and September, 1964
(Type of medium: bogus)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability, lb./in.[a]	Draw Factor[b]
I-1	7- 2-64	8- 4-64	136	26.6	10.3	9.0	9.6	32.4	28.8	29.9	30.8	28.4	29.6	1-1/2	1.569
I-2	7- 9-64	8- 4-64	137	26.4	10.1	9.3	9.8	31.8	28.2	30.2	29.6	27.0	28.1	1-1/2	1.571
I-3	7-14-64	8- 4-64	138	27.0	10.1	9.0	9.6	33.0	28.8	30.0	31.6	29.8	30.6	1-1/2	1.560
I-4	7-18-64	8- 4-64	139	26.9	10.3	9.2	9.8	34.2	30.0	32.0	33.4	31.0	32.2	1-1/2	1.565
I-5	8- 8-64	9- 8-64	140	28.1	10.6	10.0	10.3	37.8	34.8	35.6	35.0	31.6	33.4	1-1/2	1.568
I-6	8-12-64	9- 8-64	141	27.8	10.5	10.0	10.1	36.6	34.8	35.5	36.0	32.8	34.6	1-1/2	1.568
I-7	8-20-64	9- 8-64	142	28.1	10.6	9.8	10.2	37.2	33.0	35.2	32.0	29.4	30.8	1-1/2	1.575
I-8	8-24-64	9- 8-64	143	28.3	10.3	9.2	10.0	34.2	33.0	33.7	30.8	29.6	30.4	1-1/2	1.573
Current machine average				27.4			9.9			32.8			31.2		1.569
Cumulative machine average				27.0			10.1			34.4			31.2		
Machine factor, %				101.5			98.5			95.3			100.0		
Machine index, %				101.5			96.8			90.8			96.0		

TABLE XI

SUMMARY OF TEST RESULTS FOR MACHINE J
August and September, 1964
(Type of medium: semichemical)

J-1	6-10-64	7-29-64	571	27.1	10.3	9.8	10.0	44.4	40.8	42.7	39.2	37.2	38.2	Min.	1.550
J-2	6-25-64	7-29-64	572	27.9	11.0	10.1	10.5	44.4	38.4	42.4	40.2	37.0	38.8	Min.	1.547
J-3	6-27-64	7-29-64	573	27.0	10.6	10.1	10.3	38.4	34.8	36.8	36.6	34.2	35.5	1/2	1.558
J-4	7- 1-64	9- 4-64	574	26.8	9.9	9.1	9.5	43.8	39.0	40.7	39.2	35.6	37.9	Min.	1.556
J-5	7- 2-64	9- 4-64	575	27.1	9.9	9.0	9.5	43.8	37.2	41.8	38.0	35.8	37.0	Min.	1.556
J-6	8-19-64	9-17-64	576	27.0	10.0	9.0	9.6	42.0	36.6	39.0	38.8	36.0	36.9	Min.	1.542
J-7	8-20-64	9-17-64	577	26.8	9.9	9.3	9.6	42.6	40.8	41.6	38.8	37.0	37.9	Min.	1.550
Current machine average				27.1			9.9			40.7			37.5		1.551
Cumulative machine average				27.9			10.5			41.2			37.0		
Machine factor, %				97.3			93.9			98.7			101.2		
Machine index, %				100.5			96.4			112.8			115.2		

[a]Maximum tension at 600 f.p.m.
[b]600 f.p.m., minimum tension.

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE K
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability,	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	lb./in.[a]	Draw Factor[b]
K-1	7-29-64	8- 4-64	124	25.8	10.7	9.7	10.2	34.8	31.2	33.4	31.6	29.0	30.5	1	1.562
K-2	8- 1-64	8- 6-64	125	25.5	10.0	9.3	9.8	35.4	30.0	33.0	31.8	30.2	30.9	1	1.562
K-3	8-13-64	8-18-64	126	26.2	10.0	9.3	9.8	33.6	30.0	32.0	30.2	27.8	28.7	1-1/2	1.573
K-4	8-18-64	8-25-64	127	26.3	10.2	9.8	10.0	33.6	30.0	31.2	29.8	26.0	28.2	1-1/2	1.575
K-5	8-27-64	9- 2-64	128	26.3	10.0	9.4	9.8	35.4	31.8	33.5	31.6	28.8	30.1	1-1/2	1.571
K-6	9-10-64	9-16-64	129	26.0	10.5	9.5	10.0	37.8	32.4	35.2	33.4	28.8	31.7	1-1/2	1.572
K-7	9-16-64	9-22-64	130	26.3	10.1	9.0	9.6	34.8	31.2	33.5	33.0	31.4	32.2	1-1/2	1.573
Current machine average				26.0			9.9			33.1			30.3		1.570
Cumulative machine average				26.3			10.0			33.3			29.4		
Machine factor, %				98.9			98.8			99.4			103.1		
Machine index, %				96.5			96.3			91.7			93.3		

TABLE XIII

SUMMARY OF TEST RESULTS FOR MACHINE L
August and September, 1964
(Type of medium: semichemical)

L-1	6- 4-64	7-29-64	460	28.4	11.7	11.0	11.3	42.6	37.2	39.1	38.8	34.6	36.4	1	1.564
L-2	6-11-64	7-29-64	461	28.2	11.4	10.8	11.1	42.6	37.8	39.4	38.2	35.6	36.6	1	1.563
L-3	6-17-64	7-29-64	462	26.3	11.0	10.6	10.8	37.2	33.6	35.6	36.4	33.0	34.7	1-1/2	1.562
L-4	6-25-64	7-29-64	463	26.6	11.3	10.3	10.8	37.8	35.4	36.5	36.4	34.8	35.5	1-1/2	1.562
L-5	7- 7-64	8-11-64	464	28.0	11.6	11.0	11.4	40.2	36.0	38.4	38.4	35.2	37.1	1/2	1.565
L-6	7-14-64	8-11-64	465	28.9	11.6	10.8	11.0	43.2	38.4	40.6	40.8	39.6	40.2	1	1.557
L-7	7-24-64	8-11-64	466	28.7	11.5	10.8	11.0	40.8	38.4	39.4	39.4	37.0	38.6	1/2	1.560
L-8	7-28-64	8-11-64	467	28.5	11.6	10.7	11.2	44.4	37.2	40.6	42.4	37.8	40.0	1	1.558
L-9	8- 5-64	8-20-64	468	28.1	11.4	10.8	11.1	42.6	39.0	40.4	39.6	35.8	37.6	1/2	1.558
L-10	8-11-64	9- 4-64	469	29.1	11.9	10.9	11.5	45.0	40.2	42.1	40.2	34.8	37.9	1	1.562
L-11	8-18-64	9- 4-64	470	29.0	11.3	10.5	11.0	45.0	38.4	41.2	39.8	37.0	38.4	1/2	1.552
L-12	8-26-64	9- 4-64	471	29.3	11.8	10.7	11.4	46.8	39.6	43.1	39.2	37.6	38.3	1	1.562
Current machine average				28.3			11.1			39.7			37.6		1.560
Cumulative machine average				27.5			11.0			35.8			32.4		
Machine factor, %				102.8			101.0			110.7			116.0		
Machine index, %				104.7			108.7			110.0			115.7		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE M
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability lb./in.[a]	Runnability Draw Factor[b]
M-1	8- 8-64	8-20-64	1186	27.4	10.8	10.3	10.6	36.0	32.4	34.3	33.6	31.4	32.6	Min.	1.549
M-2	8- 8-64	8-20-64	1187	26.8	10.9	10.1	10.5	36.0	31.8	33.8	33.0	30.4	31.4	Min.	1.550
M-3	8-17-64	8-26-64	1194	27.1	10.9	10.4	10.7	36.0	30.0	33.0	33.0	29.2	31.0	1/2	1.559
M-4	8-17-64	8-26-64	1195	27.3	10.8	10.2	10.5	35.4	33.0	33.8	33.6	31.4	32.4	1/2	1.559
M-5	8-25-64	9- 4-64	1202	28.0	11.0	10.0	10.6	38.4	34.8	36.7	33.6	30.0	32.1	Note [c]	1.539
M-6	8-25-64	9- 4-64	1203	27.8	11.0	10.3	10.6	38.4	34.2	35.9	34.6	31.0	32.4	Note [d]	1.538
Current machine average				27.4			10.6			34.6			32.0		1.549
Cumulative machine average				28.4			11.4			36.0			32.0		
Machine factor, %				96.6			93.0			96.2			100.0		
Machine index, %				101.5			103.4			95.9			98.4		

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE N
August and September, 1964
(Type of medium: semichemical)

N-1	8- 6-64	8-19-64	--	26.4	10.0	9.7	9.9	41.4	37.2	39.2	35.4	33.0	34.7	1	1.567
N-2	8- 7-64	8-19-64	--	27.2	10.2	9.8	10.0	41.4	39.6	40.7	37.8	36.0	36.6	1	1.566
N-3	8-11-64	8-19-64	--	26.9	10.7	9.8	10.0	40.2	38.4	39.5	36.2	33.0	35.1	1	1.562
N-4	8-14-64	8-19-64	--	26.9	10.2	10.0	10.0	39.0	36.6	37.7	36.4	34.4	35.2	1	1.564
N-5	9- 3-64	9-24-64	--	26.5	10.7	10.0	10.3	40.2	34.8	37.4	34.6	33.0	33.8	1-1/2	1.566
N-6	9- 4-64	9-24-64	--	26.1	10.3	10.0	10.1	38.4	33.0	36.4	34.8	31.6	33.7	1-1/2	1.566
N-7	9- 9-64	9-24-64	--	26.5	10.1	9.8	10.0	40.8	36.6	39.1	36.2	34.2	35.2	1-1/2	1.565
N-8	9-10-64	9-24-64	--	26.3	11.0	10.0	10.2	37.8	32.4	35.4	35.0	32.0	33.6	1-1/2	1.567
Current machine average				26.6			10.1			38.2			34.7		1.565
Cumulative machine average				26.9			10.2			37.2			33.3		
Machine factor, %				99.0			98.4			102.6			104.4		
Machine index, %				98.6			98.4			105.8			106.9		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.
[c] Maximum speed at which this roll could be corrugated with minimum tension was 400 f.p.m.
[d] Maximum speed at which this roll could be corrugated with minimum tension was 500 f.p.m.

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE O
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability lb./in.[a]	Draw Factor[b]
O-1	7- 8-64	8-12-64	17	25.9	10.8	9.8	10.2	33.6	31.8	33.1	30.8	29.6	30.0	1/2	1.556
O-2	7-15-64	8-12-64	18	25.8	10.9	9.4	10.1	36.6	33.0	34.6	35.6	32.8	34.3	1-1/2	1.560
O-3	7-21-64	8-12-64	19	26.4	10.3	10.0	10.1	37.8	36.0	37.0	35.0	32.0	33.0	1	1.562
O-4	7-29-64	8-12-64	20	25.4	10.7	9.5	10.1	36.0	34.2	35.0	33.6	32.6	33.0	1	1.562
O-5	8-17-64	9-15-64	21	26.3	11.2	10.5	10.8	34.2	31.8	32.9	32.8	28.8	30.4	Min.	1.551
O-6	8-28-64	9-15-64	22	26.0	9.7	9.3	9.5	34.8	31.2	33.2	32.4	31.2	31.9	1/2	1.562
O-7	8-31-64	9-15-64	23	26.1	9.8	9.0	9.4	36.0	32.4	34.4	34.6	33.2	34.0	1/2	1.562
O-8	9- 4-64	9-15-64	24	26.5	10.5	9.7	10.1	36.0	34.2	35.4	35.0	31.8	33.3	1/2	1.563
Current machine average				26.1			10.0			34.5			32.5		1.560
Cumulative machine average				26.3			9.6			33.6			31.8		
Machine factor, %				99.3			104.3			102.7			102.2		
Machine index, %				96.6			98.0			95.5			100.0		

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE P
August and September, 1964
(Type of medium: semichemical)

P-1	8-12-64	8-21-64	718	26.5	10.3	9.4	9.9	43.2	37.8	40.9	39.2	35.8	36.8	Min.	1.551
P-2	8-19-64	8-28-64	719	26.7	11.0	9.0	10.3	42.6	39.0	40.4	36.8	35.4	36.3	1/2	1.552
P-3	8-27-64	9- 8-64	720	27.4	11.0	9.4	10.2	42.0	40.2	41.3	41.0	36.6	39.5	1/2	1.544
P-4	9- 1-64	9-11-64	721	26.5	11.2	10.1	10.7	41.4	36.6	39.2	39.6	37.0	38.4	1/2	1.555
P-5	9-11-64	9-24-64	722	26.0	10.8	8.3	10.2	40.2	36.6	38.3	38.8	34.2	35.9	1	1.557
Current machine average				26.6			10.3			40.0			37.4		1.552
Cumulative machine average				26.6			10.6			39.2			35.8		
Machine factor, %				100.0			97.3			102.1			104.5		
Machine index, %				98.6			100.2			110.9			115.0		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE Q
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability lb./in.[a]	Runnability Draw Factor[b]
Q-1	7-23-64	7-31-64	1173	27.0	10.2	9.3	9.7	37.8	31.2	34.3	33.6	30.2	31.4	1-1/2	1.571
Q-2	7-23-64	7-31-64	1174	27.0	10.2	9.4	9.9	35.4	31.2	34.2	34.4	31.0	32.5	1-1/2	1.572
Q-3	8- 4-64	8-10-64	1181	27.0	9.9	9.0	9.4	34.8	32.4	34.0	35.2	29.2	32.6	1-1/2	1.567
Q-4	8- 4-64	8-10-64	1182	26.4	9.9	9.0	9.4	36.6	31.8	34.7	34.4	32.0	33.5	1-1/2	1.565
Q-5	8-18-64	8-25-64	1189	26.8	10.4	10.0	10.2	40.8	33.0	35.8	30.6	28.4	29.6	1-1/2	1.568
Q-6	8-18-64	8-25-64	1190	26.3	10.5	9.4	10.0	39.0	33.0	35.6	34.4	28.6	31.0	1-1/2	1.568
Q-7	9-14-64	9-22-64	1197	26.8	10.2	9.5	9.8	39.6	32.4	36.8	32.8	28.8	31.0	1-1/2	1.567
Q-8	9-14-64	9-22-64	1198	26.8	10.2	9.8	10.0	37.8	35.4	36.7	36.4	31.6	34.6	1-1/2	1.569
Current machine average				26.8			9.8			35.3			32.0		1.568
Cumulative machine average				26.9			10.0			36.1			32.4		
Machine factor, %				99.4			97.9			97.7			98.8		
Machine index, %				99.2			95.7			97.7			98.5		

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE R
August and September, 1964
(Type of medium: semichemical)

R-1	8- 6-64	8-19-64	--	26.0	10.2	9.8	10.0	37.8	34.2	35.9	33.8	32.8	33.2	1/2	1.559
R-2	8- 7-64	8-19-64	--	26.9	10.0	9.4	9.8	40.2	35.4	37.9	35.2	34.4	34.8	1-1/2	1.564
R-3	8-12-64	8-19-64	--	26.7	10.0	9.7	9.9	36.6	33.6	35.5	36.0	33.6	35.1	1	1.564
R-4	8-13-64	8-19-64	--	27.3	10.8	10.0	10.3	40.2	36.6	38.2	35.4	34.6	35.0	1	1.565
R-5	9- 3-64	9-24-64	--	26.5	10.5	9.8	10.1	40.2	34.2	37.1	35.4	33.2	34.4	1-1/2	1.566
R-6	9- 9-64	9-24-64	--	26.0	10.7	10.0	10.2	37.2	33.6	35.6	34.2	30.6	32.6	1	1.563
R-7	9-11-64	9-24-64	--	25.8	10.5	9.9	10.1	36.0	32.4	34.1	33.2	31.2	32.3	1	1.563
R-8	9-18-64	9-24-64	--	26.3	10.9	10.2	10.6	36.0	33.6	34.7	34.2	31.4	32.8	1-1/2	1.570
Current machine average				26.4			10.1			36.1			33.8		1.564
Cumulative machine average				26.8			10.7			35.9			31.8		
Machine factor, %				98.7			95.0			100.7			106.1		
Machine index, %				97.9			98.8			100.0			103.9		

[a]Maximum tension at 600 f.p.m.
[b]600 f.p.m., minimum tension.

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE S
August and September, 1964
(Type of medium: bogus)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	lb./in.[a]	Draw Factor[b]
S-1	7- 1-64	8- 4-64	236	26.7	10.0	9.2	9.8	39.6	33.0	35.6	35.0	31.8	33.8	1-1/2	1.570
S-2	7- 7-64	8- 4-64	237	26.9	11.0	9.0	9.9	37.2	33.0	35.2	35.4	34.4	34.7	1-1/2	1.560
S-3	7-10-64	8- 4-64	238	27.9	9.3	8.2	8.8	38.4	33.6	36.4	37.2	34.8	36.0	1-1/2	1.554
S-4	7-15-64	8- 4-64	239	26.8	10.0	8.8	9.2	36.0	34.8	35.3	35.6	33.8	34.3	1-1/2	1.558
S-5	8- 8-64	9- 8-64	240	28.5	10.3	8.9	9.7	40.2	34.8	38.2	40.4	38.0	39.4	1	1.546
S-6	8-15-64	9- 8-64	241	29.0	10.2	9.2	9.8	42.6	38.4	40.1	37.6	34.4	35.9	1-1/2	1.561
S-7	8-20-64	9- 8-64	242	26.9	10.7	9.1	10.0	36.6	36.0	36.4	35.8	33.8	34.7	Min.	1.540
S-8	8-28-64	9- 8-64	243	26.7	10.2	9.3	9.8	36.6	31.8	34.4	34.0	31.4	33.1	1-1/2	1.559
Current machine average				27.4			9.6			36.4			35.2		1.556
Cumulative machine average				26.6			9.5			34.6			31.6		
Machine factor, %				103.2			101.6			105.2			111.6		
Machine index, %				101.6			93.8			101.0			108.4		

TABLE XXI

SUMMARY OF TEST RESULTS FOR MACHINE T
August and September, 1964
(Type of medium: semichemical)

T-1	7-10-64	8-18-64	278	26.6	10.9	10.3	10.6	36.6	34.2	35.4	35.0	31.0	32.8	1	1.565
T-2	7-18-64	8-18-64	279	27.4	10.7	10.0	10.3	41.4	34.2	37.9	36.4	32.6	34.3	1/2	1.562
T-3	7-24-64	8-18-64	280	26.8	10.7	10.2	10.4	39.6	34.8	37.6	35.6	33.6	34.4	1/2	1.560
T-4	8- 3-64	8-18-64	281	27.0	10.7	10.0	10.2	37.2	34.2	36.0	33.4	31.8	32.6	1	1.567
T-5	8- 7-64	8-18-64	282	26.8	10.7	10.1	10.3	39.0	34.8	36.7	34.6	32.2	33.0	1-1/2	1.565
T-6	9- 3-64	9-16-64	283	26.9	11.3	10.9	11.1	34.8	33.0	33.6	31.8	29.4	30.4	1/2	1.563
T-7	9- 4-64	9-16-64	284	27.4	11.2	10.9	11.0	36.6	34.2	35.0	31.6	28.6	30.1	1/2	1.565
Current machine average				27.0			10.6			36.0			32.5		1.564
Cumulative machine average				27.2			10.6			36.2			32.1		
Machine factor, %				99.2			100.0			99.6			101.3		
Machine index, %				100.0			103.2			99.9			100.0		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.

TABLE XXII

SUMMARY OF TEST RESULTS FOR MACHINE U
August and September, 1964
(Type of medium: bogus)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability,	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	lb./in.[a]	Draw Factor[b]
U-1	7- 8-64	8-12-64	25	26.9	10.2	9.2	9.7	34.8	31.8	32.9	33.8	30.0	32.2	1	1.557
U-2	7-14-64	8-12-64	26	26.1	10.0	9.1	9.8	34.2	30.0	32.6	31.0	26.8	29.1	1	1.557
U-3	7-28-64	8-12-64	27	29.3	11.3	10.6	10.9	32.4	30.0	31.2	30.8	29.0	30.1	1	1.548
U-4	8- 5-64	8-12-64	28	28.6	11.2	10.0	10.5	40.2	37.2	38.3	32.8	31.8	32.3	1-1/2	1.559
U-5	8-13-64	9-11-64	29	27.3	11.0	9.8	10.4	34.8	29.4	32.5	33.2	30.8	32.2	1-1/2	1.562
U-6	8-19-64	9-11-64	30	27.7	10.9	10.0	10.6	35.4	31.8	34.1	32.8	30.6	31.7	1-1/2	1.561
U-7	8-26-64	9-11-64	31	28.1	10.7	9.8	10.2	36.6	32.4	34.7	32.8	29.4	30.6	1-1/2	1.561
U-8	8-28-64	9-11-64	32	28.4	11.3	10.0	10.8	39.0	32.4	37.1	35.0	34.0	34.6	1	1.561
Current machine average				27.8			10.4			34.2			31.6		1.558
Cumulative machine average				27.2			9.4			34.7			30.6		
Machine factor, %				102.1			109.8			98.6			103.3		
Machine index, %				103.0			101.1			94.7			97.2		

TABLE XXIII

SUMMARY OF TEST RESULTS FOR MACHINE V
August and September, 1964
(Type of medium: semichemical)

V-1	8-11-64	8-25-64	23	27.1	10.7	10.1	10.5	38.4	34.2	36.2	35.6	32.4	34.4	1	1.559
V-2	8-18-64	8-25-64	24	26.9	10.1	9.3	9.7	40.8	34.8	37.7	34.2	29.8	32.5	Min.	1.558
Current machine average				27.0			10.1			37.0			33.4		1.558
Cumulative machine average				27.2			10.5			36.0			32.3		
Machine factor, %				99.1			95.9			102.8			103.6		
Machine index, %				100.0			98.7			102.4			102.8		

[a]Maximum tension at 600 f.p.m.
[b]600 f.p.m., minimum tension.

TABLE XXIV

SUMMARY OF TEST RESULTS FOR MACHINE W
August and September, 1964
(Type of medium: semichemical)

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, lb./in.[a]	Draw Factor[b]
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.		
W-1	8-14-64	9-17-64	H-1	27.7	9.8	8.9	9.5	42.6	37.2	39.2	39.2	35.0	36.7	1	1.567
W-2	8-16-64	9-17-64	H-2	25.6	10.0	9.0	9.5	37.8	33.6	35.4	37.0	32.4	34.5	1/2	1.570
W-3	8-29-64	9-17-64	H-3	26.8	10.4	9.2	9.8	39.0	34.2	37.7	36.4	33.0	34.7	1/2[c]	1.566
W-4	8-31-64	9-17-64	H-4	26.4	9.8	9.0	9.5	39.0	34.2	36.8	38.2	34.0	36.1	Note[c]	1.556
Current machine average				26.6			9.6			37.3			35.5		1.565
Cumulative machine average				27.2			10.0			33.0			31.1		
Machine factor, %				97.8			95.5			113.0			114.1		
Machine index, %				98.7			93.4			103.3			109.3		

TABLE XXV

SUMMARY OF TEST RESULTS FOR MACHINE X
August and September, 1964
(Type of medium: kraft)

X-1	9- 2-64	9-22-64	21	28.7	9.5	8.9	9.1	34.2	32.4	33.1	36.0	33.8	34.7	Note[d]	1.544
X-2	9- 2-64	9-23-64	22	29.0	9.6	9.0	9.2	37.2	34.2	35.8	33.2	27.8	30.0	Note[e]	1.533
X-3	9- 2-64	9-23-64	23	29.0	9.5	9.0	9.2	36.6	33.0	35.2	35.8	32.6	34.4	Note[f]	1.547
X-4	9- 2-64	9-22-64	24	28.7	9.8	9.0	9.5	36.0	33.6	34.8	35.0	32.4	33.6	Note[g]	1.548
Current machine average				28.9			9.3			34.7			33.2		1.543
Cumulative machine average				27.7			9.4			35.3			32.1		
Machine factor, %				104.4			98.8			98.2			103.4		
Machine index, %				106.9			90.4			96.2			102.1		

TABLE XXVI

SUMMARY OF TEST RESULTS FOR MACHINE Y
August and September, 1964
(Type of medium: semichemical)

Y-1		9-14-64	108	27.3	10.2	10.0	10.1	34.8	31.2	32.5	32.6	31.8	32.2	1	1.563
Current machine average				27.3			10.1			32.5			32.2		1.563
Cumulative machine average				27.3			10.3			36.2			32.5		
Machine factor, %				100.0			97.4			89.8			99.3		
Machine index, %				101.1			98.2			90.1			99.2		

[a] Maximum tension at 600 f.p.m.
[b] 600 f.p.m., minimum tension.
[c] Maximum speed at which this roll could be corrugated with minimum tension was 500 f.p.m.
[d] Maximum speed at which this roll could be corrugated with minimum tension was 250 f.p.m.
[e] Maximum speed at which this roll could be corrugated with minimum tension was 450 f.p.m.
[f] Maximum speed at which this roll could be corrugated with minimum tension was 550 f.p.m.
[g] Maximum speed at which this roll could be corrugated with minimum tension was 400 f.p.m.

submitted for a given machine is shown for each test. The latter over-all averages are reported as "current machine averages." A cumulative machine average for each test is also shown representing the mean of the current machine averages for the previous twelve periods (excluding the current period). Also shown for each machine in Tables II to XXVI are the machine factor and machine index which are defined as follows:

$$\frac{\text{current machine average}}{\text{cumulative machine average}} \times 100 = \text{machine factor (\%)}$$

$$\frac{\text{current machine average}}{\text{cumulative F.K.I. average}} \times 100 = \text{machine index (\%)}$$

The machine factor and machine index provide a means for comparing the current machine average with either the previous results for the particular machine or with the cumulative results for all machines, i.e., the cumulative F.K.I. average.

DISCUSSION OF RESULTS

Shown below from Table I are the maximum and minimum current machine averages noted for each test during the current period (August and September, 1964); the current machine average represents the mean of the averages for a given test obtained on all rolls submitted from a given machine during the current period. Also shown for each test is the current F.K.I. average which represents the mean of the current machine averages for the current period and is indicative of the test level being maintained by the industry as a whole to the extent that the industry is represented by the participating machines:

	Maximum Current Machine Average	Minimum Current Machine Average	Current F.K.I. Average
Basis wt., lb.	28.9	26.0	27.0
Caliper, pt.	11.4	9.2	10.1
Concora flat crush, p.s.i.	41.3	32.8	36.5
Single-face flat crush, p.s.i.	38.3	30.3	34.0

The runnability data for the 169 rolls evaluated during the current period are summarized as follows:

Runnability	Number of Rolls	Percentage of Total Rolls
Less than 600 f.p.m. with minimum tension	11	6.5
600 f.p.m. – minimum tension	21	12.4
600 f.p.m. – 1/2 lb. per in. tension	30	17.8
600 f.p.m. – 1 lb. per in. tension	49	29.0
600 f.p.m. – 1-1/2 lb. per in. tension	58	34.3

Supplementary to the runnability data described above, draw factors were determined for each roll of medium at 600 f.p.m. and minimum tension and are given in Tables II through XXVI for Machines A to Y, respectively.

In Table XXVII a comparison of Institute and mill Concora flat crush test results obtained on conditioned specimens is given for each machine for the current period. The inclusion of these comparisons is made possible by the fact that interested participants submit their Concora flat crush test results to The Institute of Paper Chemistry. This affords each participant the opportunity to review the level of agreement for his data with the levels shown for the other participants. Data sheets for supplying this information may be obtained from the Institute. Comparisons of this kind are a helpful adjunct to other calibration procedures. Shown in Table XXVII are (1) the Institute and mill Concora averages for each roll included in these comparisons, (2) the difference between the roll average based on Institute data and that based on mill data, (3) the Institute and mill averages based on all rolls included in the comparison, and (4) the difference between these over-all averages.

The Concora flat crush data shown in Table XXVII are summarized in Part I of Table XXVIII where for each machine the following information is given: (1) Current machine average based on Institute data, (2) current machine average based on mill data, (3) the average differences – that is, the difference between the current machine average based on Institute data and that based on mill data, and (4) the maximum difference encountered in comparing Institute and mill test averages for individual rolls. In Part II of Table XXVIII the average differences given in Part I have been converted to per cent. Comparative data from the previous two reports are also included in Part II of Table XXVIII.

TABLE XXVII

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR AUGUST AND SEPTEMBER, 1964

Machine A						Machine B						Machine C					
			Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.		
Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]
A-1	124	7-29-64	34.4	34.8	+0.4	B-1	464	7-15-64	39.7	34.8	-4.9	C-1	599	7-15-64	37.0	39.0	+2.0
A-2	125	8- 1-64	34.1	32.6	-1.5	B-2	733	7-24-64	39.6	35.5	-4.1	C-2	601	7-25-64	35.2	38.4	+3.2
A-3	126	8-13-64	32.0	32.6	+0.6	B-4	96	8- 4-64	36.8	30.5	-6.3	C-4	603	8- 1-64	37.2	38.0	+0.8
A-4	127	8-18-64	34.2	32.2	-2.0	B-5	460	8-17-64	35.0	34.0	-1.0	C-5	604	8- 8-64	39.6	37.9	-1.7
A-5	128	8-27-64	33.2	34.0	+0.8	B-6	718	8-25-64	36.6	34.9	-1.7	C-8	607	9- 4-64	38.9	39.7	+0.8
A-6	129	9-10-64	34.3	35.0	+0.7	B-7	916	8-31-64	41.9	40.7	-1.2	C-9	608	9-16-64	36.5	40.1	+3.6
A-7	130	9-16-64	34.8	35.6	+0.8												
Current Machine Av.			33.9	33.8	-0.1	Current Machine Av.			38.3	35.1	-3.2	Current Machine Av.			37.4	38.8	+1.4

Machine D						Machine E						Machine F					
D-1	--	8-10-64	36.2	40.1	+3.9	E-1	49	6-30-64	34.7	36.0	+1.3	F-1	5082	6-26-64	34.4	34.0	-0.4
D-2	--	8-11-64	36.4	38.4	+2.0	E-2	50	7-20-64	37.7	34.3	-3.4	F-2	5306	6-27-64	35.3	34.3	-1.0
D-3	--	8-13-64	34.8	36.8	+2.0	E-3	51	7-21-64	38.4	37.9	-0.5	F-3	5789	6-29-64	34.9	35.2	+0.3
D-4	--	8-14-64	37.3	37.9	+0.6	E-4	52	8-14-64	35.9	34.7	-1.2	F-4	5909	6-30-64	34.2	34.9	+0.7
D-5	--	9- 3-64	38.3	40.3	+2.0	E-5	53	8-14-64	34.9	36.5	+1.6	F-5	90	7- 1-64	36.4	36.2	-0.2
D-6	--	9- 4-64	35.8	37.8	+2.0	E-6	54	8-20-64	37.0	32.5	-4.5	F-6	270	7- 2-64	34.7	34.6	-0.1
D-7	--	9-10-64	36.2	37.2	+1.0	E-7	55	8-22-64	35.6	32.2	-3.4	F-7	1939	7- 8-64	35.0	36.3	+1.3
D-8	--	9-11-64	37.2	37.4	+0.2							F-8	93	8- 1-64	38.9	39.2	+0.3
												F-9	621	8- 4-64	32.9	35.3	+2.4
Current Machine Av.			36.5	38.2	+1.7	Current Machine Av.			36.3	34.9	-1.4	Current Machine Av.			35.2	35.6	+0.4

Machine G						Machine I						Machine J					
G-1	392	7-30-64	43.4	41.2	-2.2	I-1	136	7- 2-64	29.9	33.9	+4.0	J-1	571	6-10-64	42.7	40.6	-2.1
G-2	393	8- 4-64	42.1	42.6	+0.5	I-2	137	7- 9-64	30.2	32.4	+2.2	J-2	572	6-25-64	42.4	43.2	+0.8
G-3	394	8-11-64	39.6	38.3	-1.3	I-3	138	7-14-64	30.0	32.7	+2.7	J-3	573	6-27-64	36.8	37.6	+0.8
G-4	395	8-12-64	40.6	39.7	-0.9	I-4	139	7-18-64	32.0	32.4	+0.4	J-4	574	7- 1-64	40.7	38.9	-1.8
G-5	396	8-27-64	40.8	40.4	-0.4	I-5	140	8- 8-64	35.6	31.5	-4.1	J-5	575	7- 2-64	41.8	40.6	-1.2
						I-6	141	8-12-64	35.5	30.8	-4.7	J-6	576	8-19-64	39.0	38.4	-0.6
						I-7	142	8-20-64	35.2	30.5	-4.7	J-7	577	8-20-64	41.6	37.9	-3.7
						I-8	143	8-24-64	33.7	31.4	-2.3						
Current Machine Av.			41.3	40.4	-0.9	Current Machine Av.			32.8	32.0	-0.8	Current Machine Av.			40.7	39.6	-1.1

Please see end of table for footnote.

TABLE XXVII (CONTINUED)

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR AUGUST AND SEPTEMBER, 1964

Machine K					
	Mill		Concora Flat Crush, p.s.i.		
Code	Roll No.	Date Made	Institute	Mill	Difference[a]
K-1	124	7-29-64	33.4	34.8	+1.4
K-2	125	8- 1-64	33.0	32.5	-0.5
K-3	126	8-13-64	32.0	32.5	+0.5
K-4	127	8-18-64	31.2	30.5	-0.7
K-5	128	8-27-64	33.5	34.9	+1.4
K-6	129	9-10-64	35.2	35.5	+0.3
K-7	130	9-16-64	33.5	34.1	+0.6
Current Machine Av.			33.1	33.5	+0.4

Machine L					
	Mill		Concora Flat Crush, p.s.i.		
Code	Roll No.	Date Made	Institute	Mill	Difference[a]
L-1	460	6- 4-64	39.1	37.7	-1.4
L-2	461	6-11-64	39.4	37.2	-2.2
L-3	462	6-17-64	35.6	36.7	+1.1
L-4	463	6-25-64	36.5	36.4	-0.1
L-5	464	7- 7-64	38.4	37.0	-1.4
L-6	465	7-14-64	40.6	38.4	-2.2
L-7	466	7-24-64	39.4	36.2	-3.2
L-8	467	7-28-64	40.6	39.1	-1.5
L-9	468	8- 5-64	40.4	36.1	-4.3
L-10	469	8-11-64	42.1	37.4	-4.7
L-11	470	8-18-64	41.2	36.7	-4.5
L-12	471	8-26-64	43.1	37.0	-6.1
Current Machine Av.			39.7	37.2	-2.5

Machine M					
	Mill		Concora Flat Crush, p.s.i.		
Code	Roll No.	Date Made	Institute	Mill	Difference[a]
M-1	1186	8- 8-64	34.3	32.9	-1.4
M-2	1187	8- 8-64	33.8	34.0	+0.2
M-3	1194	8-17-64	33.0	30.4	-2.6
M-4	1195	8-17-64	33.8	30.8	-3.0
M-5	1202	8-25-64	36.7	33.5	-3.2
M-6	1203	8-25-64	35.9	38.2	+2.3
Current Machine Av.			34.6	33.3	-1.3

Machine N					
N-1	--	8- 6-64	39.2	42.1	+2.9
N-2	--	8- 7-64	40.7	40.8	+0.1
N-3	--	8-11-64	39.5	40.6	+1.1
N-4	--	8-14-64	37.7	40.2	+2.5
N-5	--	9- 3-64	37.4	37.7	+0.3
N-6	--	9- 4-64	36.4	36.7	+0.3
N-7	--	9- 9-64	39.1	36.8	-2.3
N-8	--	9-10-64	35.4	36.8	+1.4
Current Machine Av.			38.2	39.0	+0.8

Machine P					
P-1	718	8-12-64	40.9	41.8	+0.9
P-2	719	8-19-64	40.4	40.1	-0.3
P-3	720	8-27-64	41.3	38.3	-3.0
P-4	721	9- 1-64	39.2	37.4	-1.8
P-5	722	9-11-64	38.3	39.0	+0.7
Current Machine Av.			40.0	39.3	-0.7

Machine Q					
Q-1	1173	7-23-64	34.3	35.4	+1.1
Q-2	1174	7-23-64	34.2	34.8	+0.6
Q-3	1181	8- 4-64	34.0	34.0	0.0
Q-4	1182	8- 4-64	34.7	37.9	+3.2
Q-5	1189	8-18-64	35.8	35.1	-0.7
Q-6	1190	8-18-64	35.6	36.2	+0.6
Q-7	1197	9-14-64	36.8	41.2	+4.4
Q-8	1198	9-14-64	36.7	40.2	+3.5
Current Machine Av.			35.3	36.8	+1.5

Machine R					
R-1	--	8- 6-64	35.9	36.8	+0.9
R-2	--	8- 7-64	37.9	40.0	+2.1
R-3	--	8-12-64	35.5	38.9	+3.4
R-4	--	8-13-64	38.2	42.5	+4.3
R-5	--	9- 3-64	37.1	37.0	-0.1
R-6	--	9- 9-64	35.6	35.5	-0.1
R-7	--	9-11-64	34.1	35.4	+1.3
R-8	--	9-18-64	34.7	38.2	+3.5
Current Machine Av.			36.1	38.0	+1.9

Machine S					
S-1	236	7- 1-64	35.6	39.3	+3.7
S-2	237	7- 7-64	35.2	36.4	+1.2
S-3	238	7-10-64	36.4	33.6	-2.8
S-4	239	7-15-64	35.3	34.2	-1.1
S-5	240	8- 8-64	38.2	33.1	-5.1
S-6	241	8-15-64	40.1	32.8	-7.3
S-7	242	8-20-64	36.4	34.9	-1.5
S-8	243	8-28-64	34.4	32.6	-1.8
Current Machine Av.			36.4	34.6	-1.8

Machine T					
T-1	278	7-10-64	35.4	38.5	+3.1
T-2	279	7-18-64	37.9	35.8	-2.1
T-3	280	7-24-64	37.6	37.7	+0.1
T-4	281	8- 3-64	36.0	41.8	+5.8
T-5	282	8- 7-64	36.7	40.3	+3.6
T-6	283	9- 3-64	33.6	37.3	+3.7
T-7	284	9- 4-64	35.0	37.4	+2.4
Current Machine Av.			36.0	38.4	+2.4

Please see end of table for footnote.

TABLE XXVII (CONTINUED)

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR AUGUST AND SEPTEMBER, 1964

Machine U

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
U-1	25	7- 8-64	32.9	33.8	+0.9
U-2	26	7-14-64	32.6	31.9	-0.7
U-3	27	7-28-64	31.2	32.4	+1.2
U-4	28	8- 5-64	38.3	39.1	+0.8
U-5	29	8-13-64	32.5	34.3	+1.8
U-6	30	8-19-64	34.1	35.9	+1.8
U-7	31	8-26-64	34.7	31.6	-3.1
U-8	32	8-28-64	37.1	37.4	+0.3
Current Machine Av.			34.2	34.6	+0.4

Machine V

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
V-1	23	8-11-64	36.2	35.9	-0.3
V-2	24	8-18-64	37.7	34.9	-2.8
Current Machine Av.			37.0	35.4	-1.6

Machine W

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
W-1	H-1	8-14-64	39.2	40.6	+1.4
W-2	H-2	8-16-64	35.4	35.8	+0.4
W-3	H-3	8-29-64	37.7	37.9	+0.2
W-4	H-4	8-31-64	36.8	39.0	+2.2
Current Machine Av.			37.3	38.3	+1.0

Machine X

X-1	21	9- 2-64	33.1	39.2	+6.1
X-2	22	9- 2-64	35.8	36.7	+0.9
X-3	23	9- 2-64	35.2	36.4	+1.2
X-4	24	9- 2-64	34.8	36.8	+2.0
Current Machine Av.			34.7	37.3	+2.6

[a]This difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XXVIII

PART I. COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORA FLAT CRUSH AVERAGES BASED ON INSTITUTE DATA AND THOSE BASED ON MILL DATA

Machine code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Number of rolls compared.	7	6	6	8	7	9	5	0	8	7	7	12	6	8	0	5	8	8	8	7	8	2	4	4	0
Concora flat crush, p.s.i.																									
Current machine av. (Institute)[a]	33.9	38.3	37.4	36.5	36.3	35.2	41.3	--	32.8	40.7	33.1	39.7	34.6	38.2	--	40.0	35.3	36.1	36.4	36.0	34.2	37.0	37.3	34.7	--
Current machine av. (Mill)[a]	33.8	35.1	38.8	38.2	34.9	35.6	40.4	--	32.0	39.6	33.5	37.2	33.3	39.0	--	39.3	36.8	38.0	34.6	38.4	34.6	35.4	38.3	37.3	--
Average difference[b]	-0.1	-3.2	+1.4	+1.7	-1.4	+0.4	-0.9	--	-0.8	-1.1	+0.4	-2.5	-1.3	+0.8	--	-0.7	+1.5	+1.9	-1.8	+2.4	+0.4	-1.6	+1.0	+2.6	--
Maximum difference[c]	-2.0	-6.3	+3.6	+3.9	-4.5	+2.4	-2.2	--	-4.7	-3.7	+1.4	-6.1	-3.2	+2.9	--	-3.0	+4.4	+4.3	-7.3	+5.8	-3.1	-2.8	+2.2	+6.1	--

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PER CENT) BETWEEN THE CONCORA FLAT CRUSH BASED ON INSTITUTE DATA AND THAT BASED ON MILL DATA

Average difference, %[d]																									
Current report (Aug.-Sept.)	-0.3	-8.4	+3.7	+4.7	-3.9	+1.1	-2.2	--	-2.4	-2.7	+1.2	-6.3	-3.8	+2.1	--	-1.8	+4.2	+5.3	-4.9	+6.7	+1.2	-4.3	+2.7	+7.5	--
108th Report (June-July)	-3.0	-4.9	+2.9	+0.3	--	-2.5	-0.8	--	--	-2.9	+0.6	+1.4	-5.8	+3.8	-1.8	+1.0	-0.8	+2.5	--	+5.7	+7.5	+0.3	+5.6	+1.8	--
107th Report (April-May)	-2.9	+0.5	+3.6	+1.7	--	+0.3	-1.3	--	--	-1.4	-2.5	+4.5	-4.6	-1.3	+0.9	+0.8	-0.9	-2.7	--	+11.1	-0.3	+0.5	+6.9	+2.3	--

[a] Comparisons based on current machine average include only those rolls for which mill data were submitted.

[b] Average difference is the difference between the current machine average based on Institute test results and that based on mill test results with the Institute test results used as the reference. See Table XXVII.

[c] Maximum difference is the greatest difference encountered in comparing Institute and mill test averages for individual rolls. See Table XXVII.

[d] Average difference (per cent) is computed by dividing the average difference in p.s.i. (shown above in Part I of this table) by the Institute current machine average and multiplying the result by 100.

In Table XXIX a summary of the agreement between Institute and mill Concora flat crush data is given for the current period, and comparative data from the previous bimonthly period are also included. The data shown for the current period indicate that agreement between Institute and mill Concora data was good. For example, it may be seen in Table XXIX that, for the current period, 4.5% of the comparisons of Institute and mill data differed by 1% or less, 36.4% of the comparisons differed by 2.5% or less, and 77.3% of the comparisons differed by 5% or less. The maximum difference of 8.4% for the current period was slightly higher than the maximum difference of 7.5% for the previous period.

TABLE XXIX

SUMMARY OF AGREEMENT BETWEEN INSTITUTE AND MILL
CONCORA FLAT CRUSH DATA

Average Percentage Difference Between Institute and Mill Concora Flat Crush Test Results[a]	Percentage of All Machines Included Within the Indicated Range	
	Previous Period[b]	Current Period[c]
± 1.0	33.3	4.5
± 2.5	57.1	36.4
± 5.0	81.0	77.3[e]
± 10.0	100.0[d]	100.0

[a]The average obtained at the Institute was used as the reference in the calculation of the percentage differences.

[b]June and July, 1964.

[c]August and September, 1964.

[d]Maximum percentage difference was 7.5.

[e]Maximum percentage difference was 8.4.